GHAGIGI MOUAD

TD 2 DYNAMIQUE DE VEHICULE

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        %DECLARATION DES VARIABLES
m=1200;
j=2.65;
r=0.3;
fz=4000;
c1=1.28;
c2=23.99;
p=1.202;
c3=0.52;
cd=0.5;
A=1.95;
x1=20;
x2=18;
s=(x1-x2)/x1;


% linéarisation autour du point de fonctionnement
aux1=((c1*c2*exp(-c2*s)-c3)*(x2/x1^2))
af1x1=(-4*fz/m*r)*aux1-p*cd*A*r*x1/m
aux2=((c1*c2*exp(-c2*s)-c3)*(-1/x1))
af1x2=(-4*fz/m*r)*aux2
af2x1=(r*fz/j)*aux1
af2x2=(r*fz/j)*aux2
Am=[af1x1 af1x2;af2x1 af2x2];
Bm=[0 ; -1/j] ;
Cm=[-x2/x1^2 -1/x1] ;


% vérification de la commandabilité
com=[C; C*Am]
commadablité=det(com)



%déclaration des matrices(augmentés)
A5=[Am zeros(2,1) ; -Cm 0 ];
B5=[Bm;0];


%le gain K par placement de poles
wn=10;
z=0.707;
p=[-z*wn+i*wn*(1-z^2)^(1/2);-z*wn-i*wn*(1-z^2)^(1/2); -2*z*wn];
K=place(A5,B5,p)
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```
%fonction freinage

function [xp1,xp2,xpl,ep]=freinage(T,x1,x2,e)
syms x1 x2 e T
m=1200;
j=2.65;
r=0.3;
fz=4000;
c1=1.28;
c2=23.99;
p=1.202;
c3=0.52;
cd=0.5;
A=1.95;

x10=20;
x20=18;
x0=[x10;x20];

%x1=X(1);
%x2=X(2);
%e=X(3);

s0=(x10-x20)/x10;
dx1=x1-x10;
dx2=x2-x20;
u0=c1*(1-exp(-c2*s0))-c3*s0;
T0=r*fz*u0;

aux1=((c1*c2*exp(-c2*s0)-c3)*(x20/x10^2));
af1x1=(-4*fz/m*r)*aux1-p*cd*A*r*x1/m;

aux2=((c1*c2*exp(-c2*s0)-c3)*(-1/x10));
af1x2=(-4*fz/m*r)*aux2;

af2x1=(r*fz/j)*aux1;
af2x2=(r*fz/j)*aux2;

Am=[af1x1 af1x2;af2x1 af2x2];
Bm=[0 ; -1/j];
Cm=[-x20/x10^2 -1/x10];

A5=[Am zeros(2,1) ; -Cm 0 ];
B5=[Bm;0];

wn=10;
z=0.707;
p=[-z*wn+1i*wn*(1-z^2)^(1/2);-z*wn-1i*wn*(1-z^2)^(1/2); -2*z*wn];
K=place(A5,B5,p);

T=-K*[dx1;dx2;e]+T0;
xp1=-4*fz*c1*(1-exp(-c2*s0))-c3*s0-(1/2)*p*cd*A*x1^2;
xp2=r*fz*c1*(1-exp(-c2*s0))-c3*s0-T/j;
ep=0.1-Cm*[x1-x10;x2-x20];
xpl=Am*[x1-x10;x2-x20]-Bm*(-K*X);
```

-ca affiche toujour des erreurs .